WoodWorks® Connections Release Notes

Version 9.3 Canada

Design Office 9, Service Release 3

September 11, 2015

Version History (New features)

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DO = Design Office

Key Code Security

The first time you run a WoodWorks program, a Software ID is displayed and a key code is requested. To obtain a key code please follow the instructions displayed on the screen. Once you activate the software all other Design Office programs will be activated.

Keycodes will only be given to purchasers of the software. Those wishing to simply evaluate the program may type "DEMO" instead of a key code.

If you lose your key code, or if you re-install the software on a new computer, contact WoodWorks Sales for another key code.

New key codes are not required for Service Releases of the software if the original version had been installed on your computer (e.g. going from 9.0 to 9.1). New key codes are required for upgrades to major versions (e.g. going to 9 from 8.)

Educational Version

For instructions regarding installation and keycodes for the Educational Version of the software, please consult the Readme file for the Design Office Installation.

System Requirements

The following table shows the minimum hardware and software system requirements for effective operation of WoodWorks Connections.

	Minimum	Recommended (or better)	Notes
Processor speed	1 GHz	2 GHz	Single core; or equivalent performance in multiple core processors
Random access memory (RAM)	1 GB	4 GB	
Screen resolution (pixels)	1024 x 768	1440 x 900	Wide screen, adjust for other aspect ratios
Free hard drive space	80 MB	150 MB	Minimum is for download and installation; recommended includes 100 typical project files.
Operating systems	Windows XP, Vista, 7, 8 and 10		

Help Documentation

In addition to option of purchasing a printed manual, the WoodWorks Design Office ***User Guide*** in *Adobe Acrobat* format is installed with the program. It is accessed either by an icon in the *Help* subfolder in the WoodWorks Design Office *Start Menu* group or through the *Help* menu in each WoodWorks program. The *User Guide* explains program operation, providing tutorials and examples.

Connections also has ***On-line Help*** primarily to explain engineering methodology and assumptions. It is accessed either by an icon in the *Help* subfolder of the Design Office *Start Menu* group, or through the *Help* menu of the program.

Helpful ***Status messages*** are displayed in the *Status Bar* at the bottom of each window. Help for each input field is displayed there when you click on a field or tab into it.

Connections has a ***"Read Me"*** html document explaining the particulars of the program installation and operation. It is accessed from the *Read Me* subfolder of the Design Office *Start Menu* group. This document includes a detailed account of all the features added with the latest release, and a history of all changes due to previous releases.

IMPORTANT – The *On-line help*, *User Manual*, and *Read me* files have all been updated to describe the new features in the latest major version of the software. In general, only the *Read me* file is updated for changes due to intermediate service releases.

Network Installations

This section provides instructions about how to install WoodWorks software on a network server, rather than on individual computers. With a network installation, each Woodworks user opens the program from the server and runs it on their individual "client" computer.

Woodworks does ***not*** support "concurrent-use" network licensing, or monitor how many client computers are running the software at any one time. The network installation requires that a software

license be purchased for each user who has access to and runs the software. A registration key code is required for each computer that the software is run on.

A new license is not needed for a computer that is no longer in use and replaced by another computer. Contact WoodWorks Sales for a new key code for this situation, or for special arrangements in the case that there are more client computers than the number of users who *ever* run WoodWorks on those computers.

If WoodWorks Connections is to be run from a server then the network administrator must do the following after installation on the server:

1. Find the connect.ini file in the server's WoodWorks *Program Data* folder for *All users*. The location of this folder depends on the server's operating system:

   ```
   Windows 7/8
   C:\ProgramData\WoodWorks\CWC\Canada\9\

   Windows XP
   C:\Documents and Settings\All Users\Application
   Data\WoodWorks\CWC\Canada\9\
   ```

   For a Windows Server operating system, it is in one of these two places, depending on the age of the system.

   This folder also contains the database files and other needed program resources.

2. Share the WoodWorks *Program Data* folder above and the WoodWorks installation under *Program files* with permissions that allow it to be accessed by the client machines. The server computer's *Sizer* installation and *Program Data* folders must allow read privileges for all network users.

3. Create a copy of the connect.ini file and modify the copied file by

   - removing the remark symbols (;) from the following lines

     ```
     ;[Network]
     ;INI_Location=
     ```

   - entering the network path where the database files and other resources can be found on the server location:

     ```
     [Network]
     INI_Location=\\[Server Name]\[Share on server to Woodworks program
     data folder]\CWC\Canada\9\
     ```

   This will instruct the client computer to look for the database files and other resources on the server at this location.

4. Move the modified copy of the Connections.ini file into each program's installation folder on the server, that is, the folder into which the program has been installed. For a default installation on Windows 7/8, the folder is

   ```
   C:\Program Files (x86)\Woodworks\DO Canada 9\Connections
   ```

The first time one of the programs is run on the client computer, the .ini file for that program will be automatically copied from the installation folder on the server to the Program Data area of the client machine. This allows the client program to find the shared database resources on the server, and also for the user of the client computer to independently save program settings and preferences.

The following steps are necessary for each client machine that you wish to access the server installation:

1. To run the program on each client machine, you require a separate key code. Refer to the section Key Code Security, above. If it is known when installing the server software which computers will be running it, we recommend that you run the software on all client machines and order all the keycodes at once.
2. If the program does not operate, check that the *connect.ini* file has indeed been copied to the client machine's *Program Data* folder for the person using the software. The location of this folder depends on the client machine's operating system:

   ```
   Windows 7/8
   C:\Users\[username]\AppData\Local\WoodWorks\CWC\Canada\9\

   Windows XP
   C:\Documents and Settings\[username]\Local Settings\Application
   Data\WoodWorks\CWC\Canada\9\
   ```

3. You may find it convenient to create shortcuts for the client computers that point to the networked software.

NOTE: WoodWorks Database Editor (DbEdit.exe) will not work on the client computers. Any changes to the database must be made on the server computer.

Technical Support

For questions about features and functions, please first consult the ***On-line Help*** or the ***User Manual*** described in the above section.

The ***WoodWorks Web Site*** (http://www.woodworks-software.com) contains additional information which includes product news, frequently asked questions, maintenance releases and updates for registered software.

If you have installation or performance problems please contact WoodWorks Support via ***email*** at support@woodworks-software.com .

Phone support will be provided for issues that cannot be resolved via email, at ***1-800-844-1275.***

Running Connections

- The Tool Bar buttons in Connections are designed to be used in a sequential manner from left to right. The rightmost buttons remain inactive (grayed out) until sufficient data has been entered to make them functional.

- Connections automatically limits your design choices according to your input. For example if 3 rows of fasteners causes net area to fall below 75% of gross area, Connections will limit you to 2 rows. If Connections cannot find a suitable design it may be due to input that overly constrains the design process. In this situation it is recommended that all fields in the lower portion of the *Materials and Details* window be re-set to "unknown". Connections will find a design, if one exists.
- Press the *Accept* button on the Tool Bar to automatically replace all unknowns with the design results. Use this design as a starting point for your modifications.
- Connections saves your input in files with a ".des" extension and stores your text output in files with a ".rlt" extension. The diagram is never saved but is recreated each time you click the Diagram button.
- You can change the type and size of font used to display and print results via the "View" item on the Menu Bar. It is recommended to use a fixed pitch font like Courier to view the design results in orderly tables.

Important Definitions

- Row: a row of fasteners is aligned parallel to the load. Keep this definition in mind when entering fastener input in the lower portion of the *Materials and Details* window.
- For orthogonal lapped shear connections loaded in both directions, rows are defined as being parallel to the main member.
- Face plate: steel plate fastened to face of SUPPORTING column or beam in post-and-beam connections.
- Side plate: steel plate fastened to face of SUPPORTED purlin or beam in post-and-beam connections..
- For post-and-beam connections, face plate fasteners are loaded by vertical (gravity, uplift) loads while side plate fasteners are loaded by horizontal (pullout) loads.

Customizing Connections

You may change some of *Connections* design defaults by changing the "Initialization File" which can be accessed from the *View/Settings* menu of *Connections*. Instructions are contained in this file. Be sure to re-start Connections after modifying the initialization file. If Connections fails to run properly you can restore the file by re-installing Connections.

Version History

Last updated August 5, 2014.

Version 9.3 – Design Office 9, Service Release 3

1. Minimum Perpendicular to Grain Bolt Spacing in Row (Bug 3043)

The program applied a minimum perpendicular to grain bolt spacing in row of four bolt diameters instead of the three required by o CSA 086-09 10.4.3.2(a). This has been corrected.

2. Orthogonal Bolted Connections Design Failure (Bug 2951)

For orthogonal bolted connections, if the main member is not loaded, and the main member width is much smaller than the side member, then the connection design failed with any load. This has been corrected.

3. Unloaded Edge Distance for Bolted Skew Connection (Bug 2993)

For bolted skew connections, when spacing between rows is specified for the side member, the unloaded edge distance on one side became significantly larger than the other, so the bolt array was asymmetric within the side member. The unloaded edge distance should be the same on both sides.

This was an issue only with positioning the fasteners after design and did not affect the edge distance used to determine how many fasteners are possible or, and has been corrected.

concrete connection, that creates a downward load on the fastener group, is incorrectly shown as an upward arrow in both the bitmap image and the beam diagram. This has been corrected on both drawings.\

4. Row Shear Check for Sloped Member Connections (Bug 3044)

The program is not doing the row shear check from O86 09 10.4.4.4 , for sloped beam-to-beam connections despite the fact this check should be done whenever there is a parallel to grain component.

However, it is unclear at present how to define rows for this equation because neither the rows nor the fasteners in the rows are oriented in the direction of the grain. A design note has been added explaining that this check is not done.

In addition, the program was using Q_r rather than the expression including Q_r and P_r in the equation for angle to the grain brittle failure mode in 12.4.4.2 (d), and comparing to N_f, which is not correct. If P_r is not calculated, then brittle N_r should not be calculated either. This check has been removed for sloped beam connections.

5. Design Failure for Bolted Skew Connection with Large Overhang (Bug 3055)

For a bolted skew connection, a positive side member overhang can be increased so that it causes the program to report that the connection is too small to accommodate even one fastener, even though it could do so with a smaller overhang. Several errors contributed to this problem, such that it is likely that there were other problems with the calculation of possible configurations within this connection. These problems have been corrected.

6. Lapped Shear Nail Connection Internal Error (Bug 3045)

For lapped shear connections, if the area of intersection between members is too small to allow even one nail of any size, or If the thickness of the members does not allow for minimum penetration, the program reported an Internal Error message instead of an informative error message.

The messages that now appear are as follows:

- If the area of the intersection area between members is too small to allow the selected details to perform a design:

  Current set of fastener selections is not valid

  Nails not available because a member is not wide enough to satisfy minimum edge distance and spacing:
- If the nail details are left as unknown, however, the area of intersection between members is too small to allow even one nail of any size:

  Invalid Method

  Nails not available because a member is not wide enough to satisfy minimum edge distances.
- If the thickness of the members do not allow for minimum penetration:

  Nails cannot be used with the current set of main and/or side member selections

  Nails are not available because the side member is too thick to allow the largest available nail to penetrate the main member.

7. Tip Length for Penetration Depth for Lag Screw Connections (Bug 3050)

The penetration depth used for bearing length in main member for lag screw lateral and withdrawal resistance subtracts 1/2 the tip length from the main member, when according to 10.6.3.1 for lateral loading and Wood Design Manual Table 7.15 for withdrawal loading, the full tip length should be subtracted.. This has been corrected.

8. Intermittent Bolted Skew Connection Design Failure (Bug 3046)

For particular sequences of user operations the lapped skew connection failed to design and showed an Internal Error on the input screen. This happened intermittently, and has been corrected.

9. Direction of Load Arrow for Perpendicular Wood-to-Concrete Connection (Bug 2620)

A positive load on the perpendicular wood to concrete connection, that creates a downward load on the fastener group, is incorrectly shown as an upward arrow in both the bitmap image and the beam diagram. This has been corrected on both drawings.

10. Bolted Ledger Connection Penetration Depth Label (Bug 2929)

Starting with version 8.4, for bolted ledger connections, the input field for *Penetration Depth* was displayed as *Width*. This has been corrected.

11. Column-to-Base Plate Height Dimension in Diagram (Bug 3057)

The dimension lines for the main plate in the diagram of the column-to-base connection were showing the width of the plate instead of the height. This happened for all fastener types and has been corrected.

12. WoodWorks Sales and Technical Support Contact Information (DO Change 6)

In both the *Key code Registration* box and the *Help About* box, we have

- removed word *Support* from "*Sales Support"*
- asked users to provide company name rather than address,
- removed fax as a means of communication.
- emphasized email instead of phone as a means of contact
- changed the email address to be a link that opens an email message

13. Parentheses in the *Help About* box (DO Change 7)

Where parentheses were used in the *Help About,* the closing parenthesis appeared inverted at the start of the line instead of where it should have been. These occurred around things like the date of publication and the relevant parts of design code publications, and have been replaced with a dash as a means of delineating them.

Previous Versions

An asterisk (*) indicates that the item was entered into this document after the version was released

Version 9.2 – November 19, 2014 - Design Office 9, Service Release 2

1. Orthogonal Bolted Failure for Narrow Unloaded Main Members (Bug 2951)

For orthogonal bolted connections, if the main member was not loaded, and the main member width was much smaller than the side member width, then the connection design fails with any load. This has been corrected.

2. Bolted Ledger Connection Penetration Depth Label (Bug 2929)

Starting with version 8.4, for bolted ledger connections, the input field for *Penetration Depth* was displayed as *Width*. This has been corrected.

3. Bolted Ledger Connection Penetration Depth Output (Bug 2932)

The Wood to Concrete Connection Penetration Depth, which is part of the input materials specification, was not being recorded in the Design Results output. This value is now shown in the fasteners section of the output.

4. Wood to Concrete Force in Diagram (Bug 2931)

For Wood to Concrete connections, the force shown in the diagram in imperial units was the plf force multiplied by the factor 3.28. In addition, for both metric and imperial, the units shown were force units when they should be line load units. These problems have been corrected and the program shows the force in line load units.

Version 9.1 – October 29, 2014 - Design Office 9, Service Release 1b

1. Perpendicular to Grain Force for Skew Connections (Bug 2920)

For bolted skew lapped shear connections, the program outputs the perpendicular to grain load on the main member as being the same as the parallel to grain load on the side member, when it should be that load multiplied by the sin of the angle between the members. The program used this incorrect value to compute the splitting resistance design ratio. These problems have been corrected.

2. Instabilities in Sequential Design of Lapped Shear Connections (Bug 2921)

After designing a bolted skew connection with wooden side plates, the orthogonal bolted connection with wood side plate becomes unstable. After entering the data for main and side member, the program will reports an *Invalid fastener geometry*: error. However, if a new connection project is created, the same connection designs without problem.

This has been corrected.

Version 9.0 – September 17, 2014 - Design Office 9

1. Lapped Shear Wood to Steel Bolt Row Spacing (Bug 2853)

For lapped shear wood-to-steel bolt connectors, if the main member end type was set as extended, the upper limit for row spacing shown in the dropdown box was based on the entire side member width rather than the member width edge distance subtracted.

If you selected this larger value, the program is limited to fewer rows per plate than it should be, and the design failed when an allowable design is possible. This has been corrected.

2. Maximum Rows per Plate for Bolted Splice Connection with Wood Side Plate

The following problems with the calculation of rows per plate for bolted wood-to-wood splice connections have been corrected

a) Side Member Width Used (Bug (2779)

The program was using the main member width for the width of the side member. As a result, the program was allowing either too many rows, or too few when the members were of different width.

b) Net Section Used (Bug 2780)

When using O86 clause 10.4.4.6.2 regarding minimum 75% residual net area to limit the maximum number of bolt rows, the program considered only the main member and not the side member. When the side member was smaller than the main member, this could cause the program to allow more bolt rows than the net section permits. This has been corrected.

3. Allowable Plate Size for Bolted Steel Splice Connection (Bug 2858)

For steel to wood lapped shear splice connections, the program indicated that no design is possible after reducing the steel plate size, even though it was clearly evident that there is enough room for one bolt to fit. This has been corrected.

4. Allowable Bolts for Splice Connection (Bug 2755)

For bolted splice connections, if a detail like bolt size is changed before the materials were completed an internal error was shown on the materials screen, even if it was a valid detail.

If the design was performed with all details unknown, the program could design for example for a 1/2" bolt. But if you then select that bolt size, the program issued an error saying bolts in general cannot be used (an incorrect error message if the problem was in fact the bolt size).

Upon investigation, it was determined that the list of available bolts per row was often not correct, usually showing fewer bolts than possible in the connection. .

These problems were a result of calculations for the minimum edge distance using the side member width as the main member width and have been corrected.

5. Design Load Output for 2-Sided Connections (Bug 2749)

For the two-sided beam to beam connection, the program reported the factored design load in the design results as the load on just one of the members, instead of the combined load on both members. This has been corrected and the load is twice what previously appeared.

The design ratio shown for splitting resistance was also based on 1/2 the load rather than the full load. The ratio for yielding resistance was calculated correctly.

6. Brittle Resistance Failure Output (Bug 2749)

For lapped shear connections, the program repeats the brittle resistance P_r and the design ratio for main member rather than displaying the information for the side member. This is a display issue only, not affecting design, and the design ratio shown is the correct one.

7. Update of Details after Material Change (Bug 2781)

With the new user interface for version 8, a change in material size no longer triggered the update of the Details selection lists for bolt size, spacing, rows and fasteners per row. This has been corrected and the values in the dropdown list showing the limiting values for these parameters are calculated using the new material sizes.

Please note that this system did not work perfectly in every instance with version 8, and whatever inaccuracies that were in that version remain. In these cases, you must type in a valid value rather than selecting one from the list

8. Saving Files Before Material Input is Complete (Bug 2520)

Starting with version 8, if the material input was not complete or invalid when the *Connections* project file is saved, the saved file could not be loaded and a message appeared saying it was incompatible with *Connections.*:This has been corrected and files can now be saved at any stage in the input process.

9. Mouse Wheel Scrolling of Results View (Bug 2581)

Starting with version 8, the mouse wheel no longer caused the results view to scroll. This has been corrected.

10. Name of Materials/Details Window (Bug 2768)

When the *Details* button is pressed, the title of the window that appears was *Material*. This has been changed to *Materials and Details*.

11. Failure Warnings and Messages (Bug 2692)

Further improvements to the treatment of failure warnings and messages described in version 8.4, below, were made for bolted splice connections. .

12. Removal of 12” Restriction (Change 31)**

The program no longer restricts fastener rows to less than 12" long perpendicular to grain. This restriction was based on recommendations in the Wood Design Manual and was not a design code requirement. As designers can take steps to mitigate the effects of shrinkage,, it was decided to allow any fastener rows of any length.

13. Removal of Maximum Number of Bolt Rows Restriction (Change 32)**

The program restricted the number of rows of bolts to 3, because in the CSA O86-01 and previous editions of the design standard, there was a J_R factor in 10.4.4.1 that had values for 1, 2, and 3 rows only. This was eliminated for the CSA O86-09 and has now been removed from the program.

14. Distance from Top of Plate to Top of Member (Change 33)**

Removed the restriction that the edge of a plate that is unattached to any other steel plate must be at least ½” from the edge of a member. It can now extend right to the edge of a member.

15. Steel Plate Thickness (Change 36)

Steel plate sizes of 5/8", ¾", 1", and 1-1/4" have been added to the selection list for post-and-beam connections.

16. Steel Plate Grades (Change 37)

The G40.21M 350W plate steel grade has been added t the selection list for post-and-beam connections. The program now designs for this grade using an ultimate strength $F_{u.}$ of 450 MPa and a yield strength F_y = 350 MPa.

17. Welcome Box from Help Menu (Change 38)

You can now access the Welcome to Connections box from the Help menu, similarly to Sizer and Shearwalls.

18. Version in Title Bar for Open Files (Change 39)

When you had a file open, the title bar no longer had the version number on it. This has been corrected.

**These items were originally reported as being implemented for version 8.4; however that version did not in fact include these changes.

Version 8.42 - July 24, 2014 - Hot Fix

This version of the software was distributed to an individual users as a "hot fix" version to address bug 2858 and also contains the fixes for bugs 2520, 2581, 2749, 2781, and 2853, and Changes 36,37,38, and 39. All of these are described in the list for Version 9.0, above, the first version released to the general public with these corrections.

Version 8.41- February 14, 2014 - Hot Fix

This version of the software was distributed to an individual users as a "hot fix" version to address bugs 2755 and 2779, and also contains the fixes for bugs, 2780, 2768, and 2692, and Changes 31, 32, and 33. All of these are described in the list for Version 9.0, above, the first version released to the general public with these corrections.

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Version 8.4 – September 13, 2013 - Design Office 8, Service Release 4

1. Failure Warnings and Messages (Bug 2692)

With the redesign of the Connections user interface for version 8, many warnings and messages that indicated a connection was not available, or that it failed for some reason, that used to appear via pop-up messages at various stages in the connection selection process, no longer appeared in the program. Instead, a more generic message often appeared in the materials/details input screen. In particular, two messages once appeared sequentially, the second one giving the particular reason for failure and possible remedies. This second message often did not appear in version 8, and as a result it was often not clear why a connection was not available or failed, and what to do about it.

This has been corrected, and the messages that used to appear sequentially via pop-up dialogs now show permanently in the materials/details input screen, until a change is made to allow a successful design.

Version 8.3 – March 12, 2013 - Design Office 8, Service Release 3

1. Edge Distance used for Effective Depth and Splitting Resistance (Bug 2640)

For lag screw post-and-beam connections with SCL (that is, LVL or PSL) main members, the withdrawal capacity was always zero, leading to failed design whenever there is a x-direction load. This is because the CSA O86 does not include SCL in table 10.6.5.1 based on wood species groups.

Therefore, it is no longer possible to enter an x-direction load for lag screw SCL connections. We are researching withdrawal strengths for LVL connections, and if design procedures are found, this capability of using lag screws in withdrawal will be added to the program in a future version.

2. Tolerance for Checking Equal Member Sizes for Beam to Column Top Connections (Change 30)

The program compares the two members in a beam to column top connection using floating point accuracy to determine whether they are the same size. For this reason, multi-ply members that would be the same nominal thickness as a single member are not considered the same thickness because of metric conversions. This has been corrected by applying a ¼" tolerance when comparing the member thicknesses.

Version 8.2 – January 8, 2013 - Design Office 8, Service Release 2

A: Connection Design

1. Edge Distance used for Effective Depth and Splitting Resistance (Bug 2569)

For orthogonal lapped shear connections, and skew connections with negative loading, the calculation of splitting resistance using CSA O86 -09 10.4.4.7 used the loaded edge distance rather than the unloaded edge distance to determine the effective depth. This resulted in a splitting resistance that was much too large and has been corrected.

2. Effective Depth for Splitting Resistance for Sloped Beam Connections (Bug 2601)

The effective depth used for splitting resistance for sloped beam to beam connections did not take into account the member slope. The effective depth was therefore incorrect in a way that depends on connection type, loading, slope and yielded unreliable results. The program now uses the same effective depth as used for the effective shear check, which is the average of the effective depths from the two fastener groups on each side of the supported beam.

3. Multi-ply Member Design for Bolted Lapped Shear Steel to Wood Connections (Bug 1914*)

The main member thickness used in lateral strength resistance for bolted wood to steel lapped shear connections with multi-ply main member was based on single ply regardless of the number of plies selected, so that the resistance calculated was too low by a factor equalling the number of plies when the main member yield modes govern.. This has been corrected.

4. Net Section of Column to Base Connections (Bug 2606)

For column to base connections, the program uses the member width rather than the member depth to determine the area deducted by the bolt holes to create the net section. This affects the calculations for net tension resistance required by 10.4.4.6.1. for bolts and which is also implemented for shear plates, using clauses 5.5.9 for sawn lumber, 6.5.11 for glulam, and 13.3.3.8 for SCL.

For members wider than they are deep, this can cause a message to appear stating that there is a net section failure due to less than 75% net area when there is not. The 75% limitation is due to 10.4.4.6.2 for bolts and 4.3.8.2. for wood members in general, which is applied for shear plates.

5. Design Failure for PSL and LVL Members (Bug 2556)

When structural composite lumber (SCL) members (i.e. PSL or LVL) were selected, the program could not design the connection, instead displaying a message about an error in the design routine. This has been corrected by assigning these members a density based upon the weight in kN/m^3 from the database converted to specific gravity.

For timber rivets, which are not used for SCL members, the program shows a message referencing CSA O86 10.7.1.3.

6. Minimum Plate Thickness for Bolts and Shear Plates (Bug 2505)

A minimum plate thickness of 6 mm was imposed for bolt and shear plate Connections, even though there is no design code clause limiting it to that thickness in either the steel design code or the CSA O86. 1/4" is a very heavy steel plate to impose as the minimum. The minimum plate thickness of commercially available plate steel of the grades available for selection in Connections is 3/16" (0.1825" or 4.75 mm.) However, the program now allows for entry of even smaller thicknesses than that.

7. Minimum End Distance for Bolts (Bug 2573)

As the end distance in bolt diameters no longer affects the calculation via the J_E factor, so the input has been removed from the program and the design loop iterations no longer cycle though them.

8. Default Rivet Length (Bug 2553)

The RivetLength setting in Connect.ini under [FacePlate] and [SidePlate] which is to be applied as a starting length when the Rivet Length input is "unknown", was being ignored. This has been corrected.

B: Data Input

1. Fabrication Moisture Conditions for Concrete Side Members (Bug 2467)

The Fabrication Moisture Conditions remained active for concrete side members, when other, similar controls that are not relevant to concrete were disabled. This has been corrected and the fabrication conditions are not active for concrete members.

2. Min Allowable End Distance Effect on Spacing in Row Limits (Bug 2570)

Changing the minimum allowable end distance should impact the maximum spacing in row, but the spacing in row limits shown in the input combo box do not change when the end distance changes. This problem was eliminated by removing the min. end distance input, as it is no longer required for design.

3. Wood Screw Gauge (Change 25)

The word "Gauge" added to wood screw number in the materials input.

4. Print Details in Initialisation File (Bug 2551)

The "PrintDetails" option under "[SteelDesign]" was removed from the .INI settings file, as this option can be directly set in the View menu.

5. Timber Rivets vs. Glulam Rivets (Change 29)

In the connection type titles and descriptions, the terminology “Glulam Rivets” has been changed to “Timber Rivets”, in accordance with O86 10.7 and the fact that these fasteners have long been available for use with sawn lumber materials.

C: Results Output

1. Penetration Depth Message for Concrete Ledger Connections (Bug 2084)

The program always issued a disclaimer saying the minimum concrete embedment depth for ledger connections depth is 100mm, despite the fact no such restriction exists in the CSA O86. As the program does not output the embedment length as input by the user, this disclaimer has been removed.

2. Design Code Clause for Splitting Resistance (Change 27)

The code clause associated with the splitting resistance is incorrectly shown in the results as 10.4.4.2 (d), 7. This has been changed to refer to sentence (c), not (d). Furthermore, the ‘7’ has been expanded to read ‘10.4.4.7’.

3. Effective Shear Capacity Output (Bug 2276)

The design output for bolted perpendicular-to-grain connections output the same effective shear capacity value for > 5d and <5d. This is due to a requirement in the USA software, and the extra output has been removed for Canada.

4. Gauge Steel Grade (Change 25)

The misspelling of the gauge steel grade SQ2330 was corrected to SQ230.

5. Wood Screw Gauge (Change 25)

The word "Gauge" added to wood screw number in the output report.

6. Treatment Factor Punctuation (Change 26)

The semi-colon in the line: “Treatment Factor: Connection 1.00; Effective shear 1.00” has been changed to a comma to indicate that it is the treatment factor for effective shear, not effective shear itself. Similarly for the treatment factor for the Net Tension check.

Version 8.11 – May 22, 2012 - Design Office 8, Service Release 1

Some of the changes listed below first appeared in *,.41 , which was released as an Educational version only. The changes that were first introduced in this version are indicated by *Version 8.11* in the change name line.

A: Connection Design

1. Treatment Factor K_T (Feature 44 – Version 8.11)

The program did not allow you to specify the factor for preservative-treated incised lumber for use in checks for tension design using net area and shear design for effective depth, independently of the fire retardant treatment factor for connection design. According to O86 table 5.4.3 and table 5.4.3, different factors apply for preservative and fire retardant for design criteria such as shear and tension, however according to 10.2.1.7 only the fire retardant factor applies to connection design. This has been rectified as follows

a) Preservative-treated Incised Lumber

A checkbox has been added for preservative-treated incised lumber, and if checked applies the factor to effective shear capacity and tension capacity, net section. This checkbox is active only for those members that are stressed in axial tension or in lateral shear. The program checks that the least dimension of the member is less than or equal to 89 mm before applying the factor.

b) Fire Retardant Factor

The existing unnamed input has been renamed *Fire retardant factor.* It applies to both connection design and to the tension net area and effective shear checks. For the shear and tension checks, it is compounded with a fire retardant factor that may also have been entered.

c) Treatment Factors for Effective Shear Capacity

In previous versions of the program, the shear capacity using effective depth had no treatment factor applied to it. Now both the fire retardant factor and the preservative treatment factor are applied.

d) Output

Where the program used to output just one treatment factor, referring to it as just “factor”. For those connections that require it, the output now reads, e.g.

Treatment Factor: Connection 0.8; Net tension 0.75.
Treatment Factor: Connection 0.8; Effective shear 0.75.

2. Geometric Limitations and Positioning of Lapped Shear Fasteners (Bug 2424 – Version 8.11, Bug 2470)

For most lapped shear connections, the calculations to determine maximum number of fasteners per row, and maximum rows, were no longer always correct with the following consequences:

a) Limitations on Number of Fasteners

Design would sometimes not allow fastener configurations that could be designed, and at other times design for a number of fasteners that cannot fit within the connection. These problems with incorrect design were most common with bolted connections, and have been corrected.

b) Positioning of Fasteners

Even for those connections that were correctly designed, the program would position the fasteners incorrectly, sometimes to the point that they were drawn outside of the connection. Problems with incorrect positioning of fasteners in the drawing occurred with bolts, nails, and wood screws. The problems always occurred in an orthogonal connection when only the horizontal side member is loaded. When loads are on the main member or both members, the problems occurred more intermittently. The problems occurred in both the main and side member when there was a non-zero overhang or inset.

The problems occurred frequently in skewed connections, rarely in splice connections, and for ledger connections when the load is perpendicular to the connection. They have been corrected.

3. Orthogonal Lapped Shear Connections

The following problems with the orthogonal lapped shear connection type were introduced with version 8 and corrected for 8.1:

a) Failed Design for Orthogonal Bolted Connections with Unknown Bolts per Row (Bug 2360)

For the orthogonal bolted connections, if the *Bolts per Row* is set as unknown, design was never performed even if one was possible, the following text was shown:

Bolts cannot be used with the current set of material selections. Invalid fastener geometry: check details.

b) Update of Inset End Type for Orthogonal Members (Bug 2391)

For bolted connections, If *Inset* is selected as end type for orthogonal connections, and a non-zero value is set for the inset, the program claimed it cannot design, and continued to disallow design when another member end type was chosen.

An inset end type also was not preserved when you saved a file and reopened, regardless of the offset value, for main and side members. The value of the main member overhang was not preserved on a file save and reopen.

Nailed and wood screw orthogonal connections did not display the offset type upon reopening a file, but the connection diagram showed it and it refreshed when you made a change, and allowed design.

4. Bolted Orthogonal and Skewed Connection with Unknown End Type (Bug 2479)

When *Unknown* was selected as the end type for Orthogonal and Skewed connections , the program would design connections that did not fit in the allowable space, or conversely fail to design connections that were permissible. The connection shown had dimension lines extending out of the drawing. These problems have been corrected.

5. Group Tear Out, Row Shear, and Net Section Tension Resistances

The following problems have been corrected for the row shear resistance (CSA O86 10.4.4.4) and group tear out resistance (10.4.4.5) features that were added for Version 8 of the program, and the new implementation of the tension, net section check (4.3.8.2 and 10.4.4.2).

a) Net Section and Group Check for Extended End Bolted Lapped Splice Connections (Bug 2392)

For orthogonal and skewed bolted lapped shear connections with extended end types, the program does not perform the net section check or the group tear out check when it should, that is, for members in tension.

For the orthogonal connection, the program in this case issues a warning about a failed design due to the net section check, even though the amount of material removed is not in excess of 25%.

b) Minimum of Spacing and End Distance Value for Group and Row Checks (Bug 2394)

When the main member is the only one loaded in the orthogonal lapped shear connection, the program was not using the minimum of row spacing and end distance to calculate the value a_{cri} for row shear resistance and a_{pgi} for group tear out resistance, instead just using the row spacing. This created in non-conservative resistance values when the end distance was less than the row spacing.

c) Group and Row Checks for Extended End Lapped Shear Connections with One Bolt Per Row (Bug 2408)

When there is just one bolt per row on the group tear out and row shear checks for connections with extended end types, the program applied a wildly high resistance based on 10,000 mm end distance. Now, the Group and Row Tear out checks are not applied for these connections.

d) Orthogonal Connection End Distance for Row Shear and Group Tear-out (Bug 2475)

The end distance used for the calculations for bolted row shear resistance (10.4.4.4) and group tear-out (10.4.4.5) was the minimum end distance as input in the *Details* screen, rather than the actual end distance designed by the program. As a result the row shear and group tear-out resistance were almost always underestimated, which may causes over-design or failure to provide design to resist the applied force when a design exists.

6. Side Plate Design for Beam-to-Column Connections (Bug 2462– Version 8.11)

For beam-to-beam and beam-to-column connections, the program sometimes reports a design failure for the face plate connected to the supporting beam or column, when in fact the design passed. This happens when there is significant horizontal (X-direction) loading on the supported side member such that the program has to explore connections that require more than the default side plate height, which is 35% of the height of the side member.

B: Data Input and Program Operation

Most of the following problems were introduced with the reorganization of the program user interface for Version 8, and corrected for 8.1

1. Update of Details Upon Change in Member Dimensions (Bug 2402)

In version 8 when you returned to the *Materials* screen to change the member data, then returned to the *Details*, all of the limits for the input choices details screen would be refreshed. This ensured the design stayed within allowable limits. If an input was no longer allowed, it was blanked out. This system was not perfect, but it worked this way most of the time.

With the materials and connections details now on the same screen, the program materials input was no longer triggering an update of the details, so that the program could easily get into a state that no design was possible with the fastener input choices.

The details are now updated upon a change in member dimensions or configuration. As the program then redesigns, this ensures that a diagram showing a connection design stays in the *Details* screen more often.

Again, these updates are not foolproof but work as well as the previous system did.

2. Unknowns in Accepted Fastener Details (Bug 2413 –Version 8.11)

For certain connections, when the *Accept* button was clicked, some input fields remained as *Unknown* instead of indicating the designed value of the parameter. This has been corrected and the designed value is being transferred to the input fastener information.

This situation occurred for the following connections:

- Orthogonal nailed connection with wood side plate, for *Nails Per Row*
- Bolted ledger connection with perpendicular load, for *Bolts per Row* and *Spacing Between Rows*

It may have occurred in other circumstances that would also be corrected with this fix.

3. Error Message when Switching Connectors (Bug 2382)

When in *Details* view, after a successful design with one connector type, and you switched connector type in *Geometry* view, an error message appeared above the space for the diagram saying the connection is not valid, and no diagram appeared. This happened even though there was a possible valid design. It was possible

to force a design via the *Run Design* button or by changing an input for the *Main* or *Side* member. This has been corrected and the program switches seamlessly to the new fastener type.

4. Error Messages for Invalid Materials and Fasteners

a) Post-and-beam Connections (Bug 2377)

The program did not display the detailed messages that used to appear as message boxes when either

- a fastener type was not available for a connection geometry because not even one fastener would fit in the connection ,
- the currently selected fasteners do not fit within a connection so that design is not allowed.

Instead a more general message appears above the space in which the diagram is usually shown, like *Invalid connection geometry, check details*.

The program now displays the general message, and then the specific message below it.

b) Lapped Shear Connections (Bug 2414 – Version 8.11)

For all lapped shear connections, vague error messages such as *WoodWorks Connections Internal Error*, *Invalid ICM* and *Invalid Material* were displayed in the *Details* input screen when a design is not possible, instead of the more detailed messages that appeared via message boxes in previous versions of the program. For example, for the orthogonal nailed connection with wood side plates, the program showed *Woodworks Connections Internal Erro*r above the space for the diagram.. This error message has been changed to one with title "*Nails cannot be used with the current set of main and/or side member selections*"

c) Riveted Connections (Bug 2412 – Version 8.11)

The user interface changes introduced with version 8 allowed new connections to be immediately designed and displayed using the default Unknown values for all the parameters. However, for riveted post and beam connections, it was necessary to press *Run Design* in order for the connection to design. When the *Details* input first appeared, and when a material was changed, the program showed the following error message above the space where a diagram usually appears: *Current set of fastener selections is not valid - Specified number of rivets per row, and spacing within the rows, will not fit in member width given the minimum edge constraints in CSA 086 10.7.1.7.* This message is shown even though there is a possible design. It no longer appears and a rivet design is displayed if one is possible.

5. Closing of Details View (Bug 2464 – Version 8.11)

After closing the new *Details* view via the X in the upper corner of the window, there is no way to restore the view to the screen. This has been corrected.

6. Plate Thickness Input for Lapped Shear Connections (Change 20 – Version 8.11)

The input of plate thickness for nails and screws has been removed from the *Details* screen for bolted lapped shear connections, because owing to the user interface reorganization, this input is now accessed after the fastener type is known. The phrase *(nails and wood screws only)* has been removed from the corresponding input for nails and screws.

7. Penetration Depth Update for Wood-to-Concrete Connections (Bug 2375)

For Wood-to-concrete connections, the side member penetration input was blanked out when you returned to the side member after having entered it previously, necessitating that it be re-entered before designing again. This has been corrected.

8. Width and Depth Nomenclature (Change 19 – Version 8.11)

The letters *b* and *d* for input breadth and depth of the members in a lapped shear connection have been changed to *Thickness* and *Width.* These designations caused confusion because the b dimension in the usual b x d nomenclature is the d dimension for connection design. The post and beam connections have been renamed *Width b* and *Depth d* to make it clear what is meant by b and d, which are shown in the pictures identifying some of these connections.

9. Default Member Names

The following problems have been corrected, pertaining to the default values for new files of member names that you can assign to the main and side members:

a) Incorrect Member Names (Bug 2379)

For version 8, the default member names that appear in the main and side member input for some member types are not the same ones that appeared in the diagram in previous versions of the program, and do not correctly identify the member. For example they sometimes identify a column as a girder.

b) Update of Names (Bug 2379)
The program did not update a change in member name when switching from main member tab to side member and vise-versa. When returning to the main member, the old name was still there.

c) Ledger Board Name (Change 16)
The member name "Ledge" has been changed to "Ledger board".

10. DXF Export Activation (Bug 2364)

Starting with version 8, the program no longer disabled the DXF export button for those connections that do not have a DXF export, and it did not disable it before a file is saved, resulting in both cases in messages that appear saying that the DXF export failed when the button is pressed. The DXF export button is now disabled for those connections that do not allow it, that is, all but the beam-to-beam geometry.

Face Plate Title for Orthogonal Connections (Change 21 – Version 8.11)

The title *Face Plate* that appeared in the *Details* screen for bolted orthogonal connections has been removed. This applies only to post-and-beam connections.

C: Output and Drawings

1. Load Arrows (Feature 32)

Arrows showing the direction and magnitude of loading are now shown on the diagrams for all connections.

2. Diagram Display when Scrolled (Bug 2368)

When scrolling, the program would display overlapping repeated pieces of what had already been drawn rather than the bottom portion of the drawing. This has been corrected.

3. Arrows in Connection Identifier Images (Change 22)

The arrows in the images identifying orthogonal connections have been changed to correspond with the forces as they are input into the program. Previously they showed an upward force on the side member, now they show a downward force on the main member.

4. Colour of Error Message (Change 24 – Version 8.11)

Error messages that appear in the *Details* screen above where a connection drawing would ordinarily appear to indicate a failed design have been changed to a red colour for visibility.

5. Gauge Steel Output (Bug 2449 – Version 8.11)

The following corrections have been made to the output in the *Connection data* section of the design results of gauge steel specifications for side plates for lapped shear connections.

a) Steel Grade for Nails and Wood Screws

The output showed the USA designation ASTM A446 as the steel grade for nail and screw design, but the CSA O86 09 design code 10.9.4.2 indicates that SQ230 or stronger steel should be used for strength f_u value of 310 MPa to be valid. This is now indicated in the output.

b) Steel Gauge Size for Wood Screws

The steel gauge size for wood screw connections was not being displayed in the output. It has been added.

6. Precision of Unit Formatting

The following problems were introduced with version 8 and have been corrected

a) Significant Digits in Design Results (Bug 1022)

Some design results did not display their results to the number of significant digits that are calculated (e.g. 3 has been corrected to show 3.000).

b) Excessive Precision for Imperial Force Magnitude (Bug 2393)

For many places in the output files, and sometimes in the input and diagrams, and for all connection and fastener types, the program showed excessive precision for imperial forces, for example 1/100 of a pound.

c) Bolt Diameter Formatting (Change 23 – Version 8.11)

Bolt sizes which had been formatted in fractional inches, e.g. 3/4, were output as decimals without enough accuracy, e.g. 0.7. Also the metric size lost one digit of accuracy and has been restored to two, e.g. 6.35 mm

D: Installation and Help Documentation

1. Version Number in Program Name (Change 18 – Version 8.11)

Connections now has the version number in the name of the program that appears in the program title bar, and over icons that appear in the start menu. This enables you to quickly identify the version of the program you are running.

2. Streamline Network Version Setup (Design Office Feature 8)

The procedure to set up multiple users running the program from a network server has been streamlined, as follows:

a) Copying of Sizer.ini file.

Previously, you had to manually copy a version of the *connect.ini* file to all the client machines. The program now does this automatically.

It is still necessary to modify the *connect.ini* in the server to indicate it is a network version and give the location of the program on the server. A new step is required, to copy the file from the *Program Data* area of the server for *All Users* to the corresponding folder in the *Program Files* area of the server. In other words, the *connect.ini* file on the server will be found in one of the following locations

```
Windows 7 - C:\ProgramData\WoodWorks\CWC\Canada\8\
Windows XP - C:\Documents and Settings\All Users\Application
Data\WoodWorks\CWC\Canada\8\
```

After modification, it has to be copied (not only moved) to the following location, if the default installation was selected:

```
C:\Program Files (x86)\Woodworks\Cdn\Connections\
```

The advantage of this approach is that the file has to be copied only once, and within one machine, rather than distributed to several machines.

b) Modification of Database.ini File

With the introduction of new locations for database and setting files with Version 8, the network installation required you to modify the file Database.ini by indicating it was a network installation. This is no longer necessary.

c) Instructions in “Read Me” File

The instructions in the Connections *Read Me* file have been modified to explain the new procedure. In addition, the following corrections have been made:

- The instructions regarding key code security instruct you to contact WoodWorks sales, rather than using a key code that is delivered with the software.
- Instructions were given for those users who wish to modify the database files on their local machine using *Database Editor* on the server. These have been removed, as this procedure is not possible.

3. File Open from Windows Explorer (Bug 2463 – Version 8.11)

Starting with Version 8, when you tried to open a Connections file from Windows explorer, for example by double clicking, the program opened, but then asks you if you want to save the newly opened file, then it closes down the file whether you want to save it or not. This has been corrected and it is possible to open Connections projects directly from Explorer.

4. Windows File Associations for Results File (Bug 2448 – Version 8.11)

The following changes apply to the Connections design results output file with the project name and the extension ".rlt".

a) File Icon

In Windows *Explorer*, the generic icon showing a blank page has been changed to show lined page with a small replica of the *Woodworks* logo.

b) Double-click Action

When you double click the file, the corresponding project file now opens in *Connections* and immediately shows the output file in the *Connections* viewer. This is the same result as currently can be achieved by dragging the file into the *Connections*.

c) File Descriptions

The file now has the description *WoodWorks Connections Design Results* that shows up in Windows *Explorer* in the *Type* column and in the description of the selected file at the bottom.

5. Crash on Keyword Search in Help File (Bug 2363)

Connections would crash if you tried a keyword search from the help file, if the help file had been accessed from the Connections menu. This has been corrected.

Version 8.1 – Feb 3, 2012 - Design Office 8, Service Release 1, Educational Version

This version of Sizer was released as an Educational version only. The changes made for this version are listed in the later Sizer 8.11 release.

Version 8.0 – Nov 14, 2011 - Design Office 8

A: Design Codes and Standards

1. Update to CSA 086-09 from CSA 086-01 (Wood Design)

2. Update to CSA S16-09 from CSA S16-01 (Steel Design)

B: User Interface Reorganisation

1. Sequence of Operations

The program operation has been streamlined so that you do not have to create a new file just to see all the connection possibilities or change your connection. You just select from either a list of all Connections in a "tree" list or in a view containing images of the connections.

2. Connection Tree

At any point while inputting data, by clicking the "Geometry" button you can see a "tree" of all possible connections, and to select from that tree to change your connection type. The lower branches of the tree invoke views that show images of all Connections along that branch.

3. Details and Materials Screens

The previous details, materials, and geometry screens have now been combined into one screen, so all input can be viewed at once.

4. Input Diagram

The program shows the diagram of the connection while you are inputting data, updating it to show the meaning of the various fields such as “offset”.

5. Real Time Design

The program redesigns the connection automatically upon any change in the materials or loads input. When connections details change, it is necessary to press the “Run Design” button.

C: New Connection Types

1. Lag Screws

Lag screws have been added for all connection types that implement bolts, as per CSA O86 10.6.

2. Wood Screws

Wood screws have been added for all connection types that implement nails, as per CSA O86 10.11.

D: Output Reports

1. Design Code Updates

New parameters required by changes to CSA 086-09 have been added, for example embedment strengths and the group and row tear out checks. The design report has been reformatted to accommodate the new data,

2. Intermediate Data

Additional data showing the results for each yield mode have been added. It is possible to control whether the intermediate data is output via a menu item. .

3. Design Ratios

The program now reports load/capacity design ratios in the output.

4. Design Code Clauses

The program now reports relevant design code clauses.

E: Bug Fixes and Small Improvements

1. Failure for Unknown Offset (Bug 2289)

For the lapped shear connections, if an offset was left as unknown, connections would often fail when it was possible to achieve a passing design with a legitimate offset.

2. Glulam Net Tension Calculation (Bug 2304)

For bolted and shear plate connections, the program was calculating the tensile resistance for glulam using the gross section, but it should have been using using the net section.

3. Net Tension Size Factor MSR Lumber (Bug 2306)

The wrong size factor in tension K_{zt} was being used for MSR lumber. CSA O86 Clause 5.4.5.3 states that the size factor should always be unity for MSR, but the program was using the same size factors for MSR as it was for regular lumber.

4. Net Tension Size Factor MSR Lumber (Bug 2307)

The wrong tension net section value f_{tn} was being used if the material was glulam and the species was spruce-pine-fir. The program always used a value of 20.4 for ftn . When the species is spruce-pine-fir, the value should be 17.0 according to table 6.3.

5. Load Duration Factor for One Load on Member (Bug 2308)

When there are two loads with different load durations, the load with the shortest duration is used to find the duration factor K_D, in accordance with CSA 086 clause 4.3.2.4. However, the program was including the duration input of loads that were not entered and had a magnitude of zero to determine the duration factor. This has been corrected.

6. Load Duration Factor for One Load on Member (Bug 2310)

For bolts and lag screws, in orthogonal and skewed lapped shear connections , when the service conditions factor from Table 10.2.1.5 depends on the orientation of the load relative to the grain of the member the program used the load orientation for the main member when the load was in fact on the side member.

7. DFP and CSP Species for Plywood (Change 14)

As the Douglas Fir Plywood (DFP) and Canadian Softwood Plywood (CSP) species have different material properties, they are now selectable from the species field when the material is set to plywood.

8. Additional Data Display Setting (Change 8*)

A setting was added to the Settings menu that shows or hides the additional data in the output, such as the adjustment factors and yield mode values used in intermediate calculations.

9. Fixed Number of Decimal Places in Output (Change 9*)

All numbers appearing in the same column in the Design Results output now have a fixed number of decimal places. In previous versions, the numbers would have fewer decimal places than normal if the least significant digit was zero.

10. Design Results Terminology (Change 10*)

The names of some output values were changed to match the terminology used in CSA 086. Specifically, the word "Resistance" is now used instead of "Capacity", and "Connection Capacity" has been relabelled as "Yielding Resistance.

11. Output Format for Wood-to-Wood Connections (Change 11*)

Connections with two wooden members previously outputted the results for the two members in a separate column for each member. Now only one column is used and the results are split into a different section for each member.

12. Resistance to Load Ratios in Output (Change 12*)

Ratios were added in the output for quick visual comparison between the design load and the resistance.

13. Status Bar Message for Skew Connection Angle (Change 17)

The status bar message for angle input for skewed connections has changed to inform users that a 180 degree range of input is allowed, exclusive of 90 degrees

14. Help Menu items (Bug 2359)

The help menu showed the following menu items

- *Engineering Assumptions*
- *Detailing Tips*
- *Sources of Supply*

None of these pointed to the help file, so that you had to go to the Start menu icon for the help file. This has been corrected and a single menu item links to the Connections help file.

Previous Versions

Version 7.2 July 22, 2009 - Design Office 7, Service Release 2

The following issues have been addressed with this service release:

1. Bolted Lapped Shear Connections
    a) Overhang Settings
    Fixed numerous problems with the *Orthogonal* and *Skewed Lapped Shear* connections' calculations of minimum/maximum end and edge distances, allowable numbers of bolts, rows of bolts, and bolt/row spacings, when overhang offsets are specified other than the default configuration in which the member ends are flush against each other. This resulted in restricted numbers of bolts/rows, incorrectly positioned bolts, and disallowed designs that should be valid.
    b) Skewed Connections
    Connections was incorrectly calculating the end / edge distances, and allowable number of bolts or rows, under some configurations of tension/compression vs acute/obtuse angle of connection.
    Connections was sometimes allowing you to specify a number of bolts that would just fit using minimum end/edge distances and spacings, but would report "invalid configuration" when design was invoked, due to small errors in spacing increments.
    c) Wood-to-Steel Connections
    The number of bolts in a row and the number of rows of bolts for wood to steel lapped shear connection where sometimes restricted to too few .
    d) Wood-to-Wood Orthogonal Connection
    Orthogonal lapped shear connections loaded in compression where determining minimum end and edge distances incorrectly, sometimes returning distances as if they were loaded in tension. This also affected the number of bolts per row or rows allowed in the connection.
    e) Compression End Distance (Bug 1887)
    Attempting to design a bolted wood- to-wood lapped shear connection loaded in compression with a specified end distance of 4 x bolt diameter resulted in an "invalid fastener geometry" message, but selecting "unknown" end distance successfully designed using 4 x diameter. This has been corrected.
2. All Bolted Connections
    a) Bolt Positioning Tolerance (Bug 1888)
    When determining the maximum number of bolts per row can be fit into a connection a tolerance of 0.5mm is applied. In connections with several bolts per row, this tolerance accumulated and could result in bolts positioned such that their reported end/edge distances are smaller than those used for design, and a failing configuration could be accepted.
    b) Size Factor Kzt for Net Tension Tr* (Bug 1873)
    Connections of Tr does not include Kzt according to CSA 086 Clause 5.5.9 for members sized 64x89mm or 89x89mm of No 1, No 2, or No 3 lumber. This was due to an old clause 5.4.5.4 from the old O86.1-94 that was never removed from the program. Also, the Tr calculation was using the width and depth of the main member for both main member and side member Tr calculation for lapped shear connections. Furthermore, for 3-member connections the area was not being doubled.

3. Service and Moisture Conditions
    a) Moisture Content Selection and Resulting Moisture Factor (Bug 1875)
    In the Moisture Content section of the Load Material view, there were four choices for each of Service and Fabrication condition, with each set of choices redundantly allowing for service and fabrication moisture contents. The selection of Service conditions had no effect on the value of the service condition factor Ksf, and the selection of Fabrication conditions does not create factors in accordance with CSA 086 Table 10.2.1.5. This has been fixed.
    b) Service/Fabrication Conditions Input (Bug 1858)
    The input control for In-Service and Fabrication moisture conditions did not allow enough space for the lengthy strings such as Dry/Unseasoned, to the point that users will not even recognize the words 'seasoned" and "unseasoned". This has been fixed.
4. User Interface and Results
    a) Bolt Details Entry
    In the Bolt Details dialog, the list of allowable end distances shown in the End Distance drop down list was sometimes showing from 8 to 10 diameters instead of 7-10 diameters.
    b) Two-sided Connection: Member Selection and Title (Bug 17)
    Connections highlighted the selection of purlins in a two-sided connection with different shades of gray, leading users to believe the members and loads entered can be different, when they cannot. Also, "two-sided" was spelled wrong in the title of the output reports, as it was missing the hyphen.
    c) Extra Beam Hanger Combo Box (Bug 1024)
    Beam Hanger with Shear Plates in Details view had an unlabelled combo box with no choices. When this box was selected, the help information at the bottom of the Details dialog box showed, "Loaded end distance". This combo box now does not appear for column connections without loaded ends.
    d) Concrete to Wood Connections Name (Bug 1021)
    Wording "Concrete-to-wood" was changed to "wood –to-concrete" to more accurately describe the connection.
    e) Significant Digits in Design Results (Bug 1022)
    Some design results did not display their results to the number of significant digits that are calculated (e.g. 3 should be 3.000)

Version 7.1 - July 31, 2008 - Design Office 7, Service Release 1

The following issues have been addressed with this service release:

1. Calculation of Group Factor J_G
    For parallel -to-grain bolted steel-to-wood connections with more than one bolt per row, the calculation for J_G factor (CSA O86 10.4.4.1) was using the thickness of the steel side plate as the member thickness l, when it should have been using the thickness of the wood member (as per 10.4.2). This was causing the J_G factor to be much smaller than it should have been, resulting in sharply reduced connection capacities P_r (app. 30% of expected value) and extremely conservative design.
2. Bolt Design Search
    When bolt size is "unknown", the program starts its design search with a bolt size indicated in the program initialization file. If a design is not found with larger bolts, it is supposed to go back and try smaller bolt sizes, but was not doing so unless no bolt configuration with the larger bolts is possible. If such configurations are possible but fail, the program would not return and try smaller bolts.

As a result, Connections would, for example, report design failure one 3/4" bolts when it is possible to achieve a passing design with two 1/2" bolts. This has been rectified and the program now reports the design using smaller bolts.

3. Reporting of Tension Capacity, Net Area (T_r) Failure
   The program was not properly indicating failed design due to the tension capacity net area (T_r) check. It displayed a message box saying “Unable to design connector: error in design routine", and did not output design results. The program now shows all the other design results along with a prominent warning that the net area check failed.
4. Row Tear-out in Design Results Report
   The design report was displaying a line for row tear-out although no row tear-out design is done in the Canadian version of Connections.
5. Wood-to-Wood Skewed Connection
   When a wood-to-wood skewed connection design fails due to Tension Capacity, Net Area (Tr) being insufficient, the parallel and perpendicular to grain capacities Pr and Qr were not being reported.
6. Wood-to-Wood Orthogonal Connection
   a) Bolted wood-to-wood orthogonal connections were not placing the bolts within the connection area as specified in the connection details.
   b) Bolted wood-to-wood orthogonal connections were not using the specified member widths to define the available connection area, this resulted in an incorrect number of rows and bolts per row being allowed.

Version 7.0 - December 21, 2007 - Design Office 7

No changes to the version of Connections included with Design Office 7.0 when compared with 2002b.

Version 2002b - May 23, 2006 - Design Office 2002 Service Release 3b

A. Concrete-to-Wood Connections
   1. Design Capacity using Imperial Units
      The calculation of both parallel and perpendicular to grain bolt design capacity had non-conservative errors of as much as 70% when working in imperial units with concrete-to-wood connections.

   2. Force Unit Labels
      a. The units label displayed for concrete-to-wood ledge connections in the Materials view has been changed to plf when imperial units are selected. Previously, it was showing kN/m for both unit systems.
      b. The force units in the design results output were shown as lbs for imperial and kN for metric. This has been changed to plf, and kN/m respectively.
   3. Force Label
      Changed the "Force" label on concrete-to-wood connections to say "Factored Force" to be consistant with all other geometries.
   4. Metric to Imperial Conversion
      After switching from metric to imperial units, the magnitude of the Force input was being converted from kN/m to pounds per meter. This has been changed to plf.
   5. Concrete Design Note

The design note in the text output has been modified to say "...Connection valid for bolt embedment of 100 mm or more.". Previously it was referring to USA concrete provisions.

6. Overlap Distance in Output
   The overlap distance reported in the design results output of concrete-to-wood connections has been changed to indicate it is a continuous overlap instead of reporting a meaningless overlap length.
7. Load and Capacity Output Precision
   Changed the number of significant digits for the Factored load to two digits for metric and one digit for imperial, where previously both had zero-digit precision. Changed the number of significant digits for the Connection capacity to to have one digit for imperial units, where previously it had zero digits.

Version 2002a - Oct 29, 2002 - Design Office 2002 Service Release 1

1. Help and Keycode Dialogs
   Contact information for sales and support was updated.

Version 2002 - Nov 18, 2002 - Design Office 2002

1. Lapped Splice Bolted Connections
   The generalised geometry currently used for nails has been extended to bolts. The program designs right angle connections with loads in both directions, sloped connection with load parallel to the side member, and splice connections using bolts. It automatically places the bolts in the intersection of the members according to the spacing rules.
2. Wood-to-Wood Bolted Design
   The program determines resistances for wood-to-wood lapped splice connections. It previously designed only steel to wood connections for bolts.
3. Steel-to-Wood Lapped Splice Connections
   For both bolted and nailed generic connections, it is be possible to design a steel plate entirely within the boundary of the wooden member. This facilitates splitting of complicated connections into their component parts.
4. Three-member Connections
   Bolted connections are able to have two steel or wood side members with a wood main member, or a steel main member with wood side members. Three wooden member nailed connections will be implemented.
5. Ledge Connection
   A ledge connection has been implemented to allow the user to model a continuous bolted sill plate ledge.
6. Wood-to-Concrete Design
   A connection consisting of a ledge bolted to a concrete wall has been implemented.
7. Greater Range of Angled Connections
   For both nails and bolts, there will be a larger sweep of angles possible in the "skewed" connection. The user can specify and angle from zero to 180 degrees, making it possible to design trusses more accurately.
8. CSA O86-01 Design Standard
   The program has been updated to conform to CSA O86-01 design standard. These changes include:
9. Fire Retardant Factor

O86 10.2.1.7 requires that tests be performed by the manufacturer of wood treatments and the resulting effects on strength be published. Thus, the fire retardant combo box has been changed to have one option - [not active] or the user may enter a value between 0.1 and 2.0.

10. Jc Factor
    Table 10.3.3B giving values of Jc for end distances in tension, the headings have changed such that Jc no longer depends on number of shear planes.
11. Steel Strengths
    The value of embedding strengths for steel used in the program have been changed to 1435.71 and 1615.17 for ASTM 36 and G40.21M 300W steel grades respectively, according to O86 10.4.4.2.
12. Lumber Densities
    Relative densities of lumber updated to conform with Table A10.1

Version 99 - Dec.1, 1998

Added skewed, orthogonal and spliced generalized “lapped shear” connection geometries, using the nails, which are also new to the program.

Version 97b - Nov.16, 1998

CSA O86.1 has been added to the Help menu. Selecting it will automatically start Acrobat Reader which is required for viewing the electronic version of the CSA manual.

Version 97a - March 22, 1998

No information available about this release.

Version 97 – Feb 1, 1998

Added steel design of plates, washers, and bolts for shear, tension, and bearing.

Version 1.0 - April 6, 1995

Original version with beam-to-beam, beam-to-column, and column-to-base connections using glulam rivets, bolts, or shear plates as connectors, and beam-to-beam top hanger connection.